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Safe Limits of Contrast Vary with Hydration Volume:Prevention of Contrast-Induced Nephropathy after Coronary Angiography

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Background: There have been few studies of the prevention of contrast-induced nephropathy(CIN)on investigating the effect of intravenous hydration volume on relative safe maximum volume of contrast.This study investigated the effect of intravenous hydration volume on the safe maximum volume of contrast.
Methods: The ratios of contrast volume to creatinine clearance(V/CrCl)and hydration volume to body weight(HV/W)were determined in patients undergoing coronary angiography. Receiver-operator characteristic(ROC)curve analysis based on the maximum Youden index was used to identify the optimal cutoff for V/CrCl in all patients and in different hydration volume sub-groups(HV/W≤12and>12).
Results: Eighty-six of 3273(2.63%)patients developed CIN.ROC curve analysis indicated that V/CrCl>2.44 was a predictor for CIN in all patients (sensitivity=71.6%, specificity=70.5%,C-statistic:0.780), and V/CrCl>2.44 was significantly and independently related to the risk of CIN (adjusted OR:4.157;95% CI:2.449-7.059,p < 0.0001)(age > 75, diabetes, congestive heart failure, emergent coronary angiography, anemia, hypertension, intra-aortic balloon pump, hypotension) and the risk of 2 year death (adjusted HR:2.62;95%CI:1.84-3.87, p< 0.0001), even after including other clinical and procedural variables in multivariate logistic regression,the V/CrCl ratio for CIN was1.87 in the insufficient hydration subgroup (HV/W≤12,sensitivity=67.9%,specificity=64.4%,C-statistic:0.739,adjusted OR:3.239;95%CI:1.312-7.995,p=0.0108)and2.93in the sufficient subgroup(HV/W>12,sensitivity=69.0%,specificity=65.0%,C-statistic:0.732,adjusted OR:3.040;95%CI:1.640-5.633,p=0.0004).
Conclusions: Individual relative safe maximum volume of contrast during coronary angiography adjusted with different hydration volume may be more reliable even with the significance of long-term prognosis. We could moderately relax limits of contrast dose among patients with adequate hydration.

Table1. Univariate Analysis and Multivariate Associations between CIN and V/CrCl for patients HV/W>12

Variable	Univariate Analysis			Multivariate Analysis		
	OR	*CI*	*p*	*OR*	*CI*	*p*
V/CrCl>2.93	4.133	2.338-7.307	<0.0001	3.040	1.640-5.633	0.0004
Age ≥75 years	2.514	1.467-4.306	0.001	1.964	1.084-3.559	0.0259
Hypotension	3.745	2.187-6.411	<0.0001	2.295	1.255-4.196	0.0070
IABP	1.041	0.576-1.880	0.894			
Emergent PCI	1.409	0.790-2.512	0.246			
Hypertension	2.845	1.623-4.984	<0.0001	2.214	1.190-4.122	0.0122
Diabetes	8.527	4.471-16.264	<0.0001	4.139	1.985-8.629	0.0002
CHF	5.294	1.910-14.673	0.001			
Anemia	1.872	1.092-3.210	0.023			

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Prevention of Radio-Contrast Mediated Acute Renal Injury with Intravenous Sodium Bicarbonate - Results of the PRIMARY Trial

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Background: Radiocontrast-induced acute kidney injury (RAKI), is associated with increased short and long-term mortality, and poor renal outcomes. The usefulness of sodium bicarbonate (SB) compared with normal saline (NS) in preventing RAKI in patients undergoing coronary angiography with renal dysfunction is controversial. The goal of the PRIMARY study was to evaluate the 1-year and 5-year, clinical and renal outcomes of SB versus NS in preventing RAKI, in patients with chronic kidney disease (CKD) stage III-IV undergoing coronary diagnostic and interventional procedures.
Methods: Three-hundred and ninety six patients (n=396) (mean age: 67±12) (52% males) with a GFR < 60 mL/min/1.73m2, undergoing elective coronary angiography were included in the study using an iso-osmolar contrast agent. Patients were randomized to receive either 154 mEq/L of intravenous (I.V.) SB (n = 192) or NaCl (n = 190) with 5% dextrose at 3 mL/kg for one hour before contrast administration followed by 1 mL/kg/hr for 6 hours post- procedure. Renal function was measured in all patients before, and 48 hours after contrast administration. Incidence of RAKI, in-hospital, 1 year and 5 year mortality and renal outcomes were compared between groups. RAKI was defined as increase in serum creatinine > 0.5 mg/dL or an increase from > 25% baseline within 48 hours after the administration of contrast.
Results: There were no statistically significant differences in each group regarding baseline demographics, medical therapy, renal function or co-morbidities, contrast volume used, hydration volume pre- and post-procedure, coronary artery severity, incidence of revascularization and ejection fraction.
No significant differences between groups were noted in the incidence of RAKI [25 (13%) treated with SB vs. 31 (16%) with NS (p= 0.89)]. The in-hospital mortality, 1 or 5-year mortality or need for renal replacement therapy was not statistically different between groups.
Conclusions: In patients with stage III-IV CKD undergoing diagnostic and/or interventional coronary angiographic procedures, the use of SB is as effective as NS in preventing RAKI, with similar in-hospital, 1 and 5 year mortality and need for renal replacement therapy.

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Abstract Withdrawn

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Long-Term Prospective Outcome Analysis in High-Risk Patients for Contrast-Induced Acute Kidney Injury

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Background: Contrast-induced acute kidney injury (CI-AKI) is associated to increased morbidity, mortality, health costs and prolonged hospitalization. Common definitions of CI-AKI are: a relative increase in Serum Creatinine (SCr) of at least 25% from the baseline values (definition 1), an absolute increase in SCr concentration of at least 0.5 mg/dL (definition 2), and an absolute increase in SCr of at least 0.3 mg/dL (definition 3), all presenting within 48-72 hours. This study has two main aims: a) to prospectively describe the long-term outcomes in a population at high-risk of CI-AKI development b) to clarify which definition of CK-AKI correlates best with long-term events.
Methods: Monocentric, prospective, observational registry enrolling patients undergoing coronary angiography with at least one of: age ≥75; diabetes; stages 2 or 3 chronic kidney disease (NKF) or ST-segment elevation myocardial infarction (STEMI). Biochemical determinations were assessed at baseline under preventive hydration and 12, 24, 48 and 72 hours thereafter. Blood examinations were repeated also at 1 month and subsequently every 6 months after discharge.Primary clinical endpoint was a composite of death, MI and need for dialisys.
Results: We enrolled 216 patients (72% males; mean age 70 years) followed for a median of 1121 days. Thirthy-nine patients(18.1%) developed CI-AKI by definition 1, 16(7.4%) by definition 2 and 37(17.1%) by definition 3. 20% of patients had baseline mild/moderate renal dysfunction (GFR>30 mL/min/1.73m2), while 46.7% were diabetics. At complete FU we observed 10 CV deaths(4.6%), 5 non-CV deaths(2.3%), 9(4.2%) MIs, 7(3.2%) major stokes and 6(2.8%) need for chronic dialysis. At Cox-regression only CI-AKI assessed by definiton 3 predicted primary EP(p=0.04; HR: 2.168; 95%CI: 1.193-4.734). Renal impairment persisted at 30 days in 40.5% of CI-AKI definition 3 patients and was associated with worst long-term outcome(p< 0.001;HR4.758.95%CI:2.039-11.100).
Conclusions: High-risk CI-AKI patients had 13.9% primary EP at 3-years.An absolute increase in SCr of at least 0.3 mg/dL seems within 72h seems the most clinically useful CI-AKI definition. Persistent renal damage at 30 days correlates with poorer outcomes.

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Comparison of Target Lesion Revascularization in Patients with Renal Insufficiency after Sirolimus-eluting Stent and Everolimus-eluting Stent Implantation: Three-year Outcomes from Single-center Retrospective Study

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Background: Everolimus-eluting stent (EES) is one of the most commonly used newer generation drug-eluting stent (DES) in clinical practice. However, the relative merits of EES against the previous gold-standard sirolimus-eluting stent (SES) for patients with renal insufficiency (RI) have been less extensively assessed. We aimed to evaluate the three-year outcomes after SES and EES implantation for patients with RI.